

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in this application. Added text is indicated by underlining, and deleted text is indicated by ~~striketrough~~. Changes are identified by a vertical bar in the margin.

Listing of Claims:

1 1. (currently amended): A storage device comprising:
2 a control unit;
3 a cache memory; and
4 a disk device;
5 wherein said control unit records ~~a data readout location in the disk device as~~
6 access history information that identifies a data access pattern and a history of data readout
7 activity having been performed for the disk device by ~~for~~ each computer among a plurality of
8 computers connected to said storage device, respectively reading out data from said storage
9 device to specify one of said computers based on predetermined information including both a
10 first information for specifying the access history and a second information indicating the
11 specified computer, and then pre-reads data to be used by said one of said computers from said
12 disk device to said cache memory based on a command containing information for specifying
13 said history and information for specifying said one of said computers, the command being
14 received from a management computer communicating with the storage device;
15 determines data to be pre-read ~~said pre-read data being determined~~ in accordance
16 with said data access pattern and said history of data readout activity of said one of said
17 computers; and
18 wherein the control unit records said history into a predetermined unit for
19 controlling the cache memory, as being linked with said information for specifying said history
20 and said information for specifying said computer, and reads data from said disk device to said
21 cache memory, based on said history linked with said information for specifying said computer

22 | and said information for specifying said history contained in said command in response to
23 | receiving said command from the management computer.

1 | 2. (canceled).

1 | 3. (currently amended) A storage device according to claim 2 1, wherein
2 | said predetermined information includes information on time, and said control unit records said
3 | history as being linked with information for specifying said history and information for
4 | specifying said computer until a predetermined time.

1 | 4. (Original) A storage device according to claim 3, wherein said
2 | predetermined information includes information for specifying a data storage location of said
3 | disk device, and said control unit records said history as being linked with said information for
4 | specifying said history and said information for specifying said computer from a time when said
5 | computer specified by said information for specifying said computer reads out data stored at a
6 | data storage location of said specified disk device.

1 | 5. (Original) A storage device according to claim 4, wherein when a
2 | command of stopping record of said history is received, the record of said history is stopped.

1 | 6. (canceled)

1 | 7. (Original) A storage device according to claim 4, wherein an operating
2 | system program to be used by said specified computer is stored in a location specified by the
3 | information for specifying the data storage location of said disk device.

1 | 8. (currently amended) A storage device according to claim 6 5, wherein an
2 | operating system program to be used by said specified computer is stored in a location specified
3 | by the information for specifying the data storage location of said disk device.

1 9. (Original) A storage device according to claim 1, wherein the history is
2 arranged to be recorded in a form of a table specifying a relationship among a history ID, the
3 data readout location and the computer using the data having been stored in the location.

1 10. (currently amended) A system including a storage device having a disk
2 device and a cache memory, a management computer, and a plurality of computers connected to
3 said storage device, comprising:

4 said management computer for transmitting to said storage device a first
5 command containing information for specifying any one of said computers and information for
6 specifying access history information that identifies a data access pattern and a history of data
7 readout activity for said specified computer and storage device;

8 said storage device for, when a computer specified by said first command reads
9 out data from said storage device, reading a storage location of said data in said disk device as a
10 history that is linked with information for specifying said access history information of data
11 ~~readout activity~~ and information about said computer to be specified contained in said first
12 command;

13 said management computer for transmitting to said storage device a second
14 command containing information for specifying any one of said plurality of computers and
15 information for specifying said access history information of data readout activity; and

16 said storage device for reading out data specified by said access history
17 information of data readout activity from said disk device to said cache memory, based on said
18 second command received from said management computer, said pre-read data being determined
19 in accordance with said access history of data readout activity information of said computer.

1 11. (Previously presented) A system according to claim 10, wherein said
2 management computer includes information about a schedule of a designation to be transmitted
3 to said storage device by said computer itself, and said management computer transmits said first
4 command or second command to said storage device based on said schedule.

1 12. (Original) A system according to claim 10, wherein said management
2 computer designates said specified computer to start said specified computer itself after said
3 second command is transmitted to said storage device.

1 13. (Previously presented) A read-ahead method to be executed in a storage
2 device, comprising the steps of:
3 transmitting to said storage device a first command containing information for
4 specifying a first computer from among a plurality of computers connected to said storage device
5 and access history information that identifies a data access pattern and a history of readout
6 activity having been performed for the storage device by of said first computer to be used to
7 perform said read-ahead;

8 in said storage device,
9 recording a location where data associated with said first command is to
10 be stored as a ~~history~~ and linked with information for specifying said access history information
11 and information for specifying said first computer when said first computer reads out said data
12 from said storage device; and

13 transmitting a second command containing information for specifying said
14 fist computer and information for specifying said access history information to said storage
15 device;

16 in said storage device,
17 pre-reading data from a recording medium included in said storage device
18 based on said recorded access history information corresponding with said information for
19 specifying said first computer and said information for specifying said history contained in said
20 second command.

1 14. (Previously presented) A read-ahead method according to claim 13,
2 further comprising the steps of:
3 transmitting information about time to said storage device; and

4 recording said history until the time specified by said information about time in
5 said storage device.

1 15. (Previously presented) A read-ahead method according to claim 13,
2 further comprising the step of:
3 recording said history from a time specified by said information about
4 time in said storage device, based on said information about time.

1 16. (Original) A system according to claim 10, wherein said management
2 computer classifies said plurality of computers into a plurality of groups when registering said
3 computers.

1 17. (Previously presented) A storage system comprising:
2 a plurality of computers; and
3 a storage device in data communication with each of said computers, said storage
4 device comprising:
5 a plurality of disk drive units;
6 a cache memory for storing portions of data stored on said disk drive units
7 that are read out from said disk drive units; and
8 a control unit for controlling reading out of data stored on said disk drive
9 units,
10 said control unit configured to:
11 obtain storage-device-access history information that identifies an access
12 pattern and a history of data readout activity for each of said computers;
13 store information in tabular form which identifies each of said computers
14 with its respective storage-device-access history information; and
15 pre-read data from said disk drive units for at least one of said computers
16 based on its respective storage-device-access history information.

1 18. (new) The storage device according to claim 1, wherein the second
2 information comprises a MAC (Media Access Control) address.

1 19. (new) The storage device according to claim 1, wherein the command
2 comprises a PointRead-command for instructing the storage device to start a pre-read operation
3 to be performed by the control unit in response to a predetermined condition having been defined
4 in advance for starting the pre-read operation.

1 20. (new) A storage device comprising:
2 a control unit;
3 a cache memory; and
4 a disk device;
5 wherein said control unit:
6 records access history information that identifies a data access pattern and
7 a history of data readout activity having been performed for the disk device by each
8 computer among a plurality of computers connected to said storage device, respectively
9 reading out data from said storage device to specify one of said computers based on
10 predetermined information including both a first information for specifying the access
11 history information and a second information having a MAC (Media Access Control)
12 address for specifying the computer,
13 pre-reads data to be used by said one of said computers from said disk
14 device to said cache memory based on a command containing information for specifying
15 said access history information and information for specifying the one of the computers,
16 the command being sent from a management computer communicating with the storage
17 device and being a PointRead-command for instructing the storage device to start a pre-
18 read operation to be performed by the control unit in response to a predetermined
19 condition having been defined in advance for starting the pre-read operation, and

20 determines data to be pre-read in accordance with said access history
21 information of data readout activity of said one of said computer; and
22 wherein the control unit further:
23 records said access history information into a predetermined unit for
24 controlling the cache memory, as being linked with said information for specifying said
25 history of data readout activity and said information for specifying said computer, and
26 reads data from said disk device to said cache memory based on said
27 access history information linked with said information for specifying said computer and
28 said information for specifying said history of data readout activity contained in said
29 command in response to receiving said command from the management computer.

1 21. (new) A storage system comprising:
2 a storage device including:
3 a control unit;
4 a cache memory; and
5 a disk device;
6 a plurality of computers respectively connected to the storage device through a
7 network for performing any program having been stored in the storage device;
8 a management computer connected to the storage device through the network for
9 sending one of a plurality of commands to the storage device;
10 wherein the control unit is provided within the storage device such that the control
11 unit:
12 records access history information that identifies a data access pattern and
13 a history of data readout activity having been performed for the disk device by each
14 computer among the a plurality of computers respectively reading out data from the
15 storage device to specify one of the computers based on predetermined information
16 including both a first information for specifying the access history information and a
17 second information having a MAC (Media Access Control) address for specifying the
18 computer;

19 pre-reads data to be used by the one of the computers from the disk device
20 to the cache memory based on a command containing information for specifying the
21 access history information and information for specifying the one of the computers, the
22 command being sent from the management computer and being a PointRead-command
23 for instructing the storage device to start a pre-read operation to be performed by the
24 control unit in response to a predetermined condition having been defined in advance for
25 starting the pre-read operation;

26 determines data to be pre-read in accordance with the history of data
27 readout activity of the one of the computers;

28 and wherein the control unit(102):

29 records the access history information into a predetermined unit for
30 controlling the cache memory, as being linked with the information for specifying the
31 history of data readout activity and the information for specifying the computer; and

32 reads data from the disk device to the cache memory based on the access
33 history information linked with the information for specifying the computer and the
34 information for specifying the history of data readout activity contained in the command
35 in response to receiving said command from the management computer.